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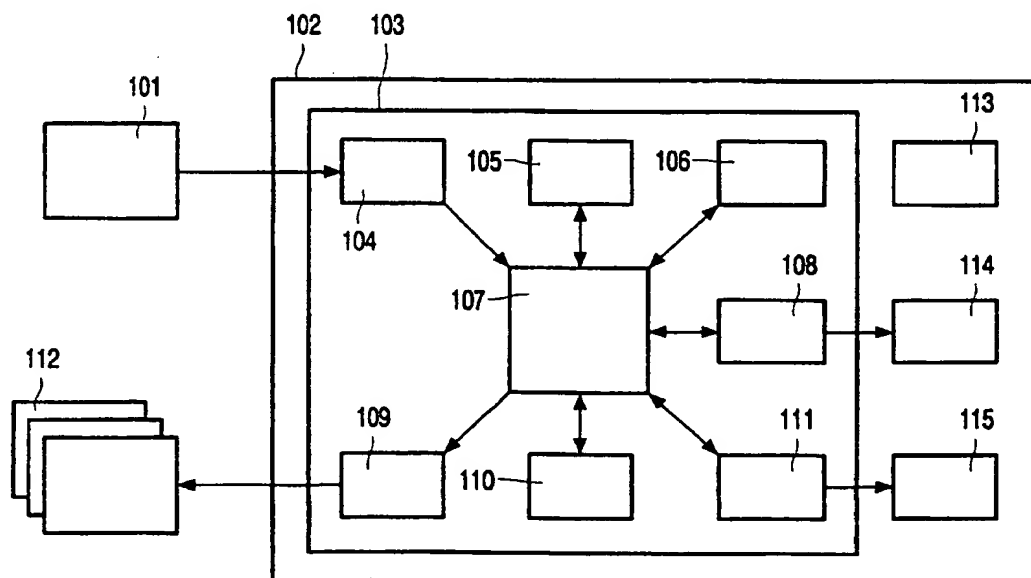
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(54) Title: SYSTEM AND METHOD FOR CONTROLLING MULTIPLE HOME ELECTRONICS DEVICES



(57) Abstract

Using the TV's remote control, the user can send infrared commands to the TV that is meant for another home electronics device, e.g. a VCR, DVD, air conditioner or home lighting. The TV then translates these signals and generates new infrared signals that is compatible with the target devices.

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System and method for controlling multiple home electronics devices.

FIELD OF THE INVENTION

The invention relates to system, a device controller and a method for controlling multiple home electronics devices.

5 BACKGROUND OF THE INVENTION

Modern home electronics devices are often capable of being controlled remotely. For example, they are supplied with a remote control which allows the user to enter commands which are then sent to the device by means of, for example, infrared (IR) signals. As the number of such devices increases, users are faced with a plurality of remote controls. This is
10 inconvenient, because it is difficult to keep track of where each of the remote controls is located, and which remote control belongs to which device. Moreover, each remote control has a different lay-out which has to be learned and remembered by the user. To solve this problem, universal remote controls exist which store IR codes for a large number of devices and allow the user to control all those devices by means of one single remote control. For that
15 purpose, the universal remote control has a large number of buttons to enable the user to select a device to be controlled and to control the specific functions of all individual devices. To control a particular device, the user has to select the device, aim at it with the remote control and operate the buttons which are suitable for controlling said device. It is further known to provide a universal remote control with learning means which allow IR
20 codes of a new electronics device to be learned, so that the new device can be controlled with the universal remote control subsequently.

OBJECT AND SUMMARY OF THE INVENTION

It is an object of the invention to provide an improved system and method of the type defined
25 in the opening paragraph. To that end, the system according to the invention comprises a device controller and a remote control for remotely controlling said device controller. The device controller further comprises transmission means for transmitting command signals to a plurality of devices and mapping means for mapping the commands received from the remote control to commands which are suitable for controlling any of the plurality of devices.

In this way, it is achieved that the user can operate a plurality of devices by aiming with a single remote control at a single apparatus, namely the device controller. The controlled devices may be located at other locations in the same or a different room. The remote control can be kept simple because it need only store the command codes of the device controller.

5 The device controller comprises memory means for storing command codes of a large number of electronics devices. The mapping means take care of converting the commands received from the remote control to commands which can be interpreted by the controlled devices. For example, the transmission means may be capable of transmitting IR commands to the controlled devices. This can be achieved by means of so called blaster (transmitting IR
10 commands in multiple directions) or shooter technology (conducting IR commands via a cable to the IR receiver of the controlled device) which are known per se.

In a preferred embodiment of the system according to the invention, the device controller is built into a television receiver. The TV's remote control can be used to control the TV and other devices through the built-in device controller, such as a VCR, a DVD, an air
15 conditioner or home lighting. The TV's screen can be used to provide the user with feedback about which device is being controlled and to display device-specific menus. The device controller has discrimination means for discriminating commands for controlling the television receiver from commands for controlling any of the plurality of devices. The commands for controlling the television receiver are directly executed by the television
20 receiver, while the commands for controlling another device are converted to suitable command signals and transmitted to the device.

The device controller preferably comprises learning means for learning new IR commands from other devices and store them in the memory means. In this case, the TV's screen can be used to give feedback on the learning process. The user is allowed to select a programming
25 mode, whereby a step by step guide is activated. The user is guided to select keys of the remote control to be assigned to specific commands of the controlled device. There is also feedback to the user that the TV has indeed captured the code. Hence the user is aware what is being programmed. This is far more convenient than the known approach of programming a learnable remote control, whereby the learnable remote control is placed in front of another
30 remote control to capture the IR codes transmitted by the other remote control. Minimal feedback is generated in this prior art approach.

It is an achievement of the invention that the user need only a basic remote control that comes with the TV and only need to aim at the TV. The TV will translate these requests transmit out appropriate infrared codes to the target device(s).

BRIEF DESCRIPTION OF THE DRAWINGS

These and other aspects of the invention are apparent from and will be elucidated, by way of a non-limitative example, with reference to the embodiment(s) described hereinafter. In the drawings,

Figure 1 shows a diagram of a television system as an embodiment of a system for controlling electronics devices according to the invention,

Figure 2 shows a state diagram of various modes of the system according to the invention,

Figure 3 shows a flow chart of the IR signal decoding and routing.

DESCRIPTION OF EMBODIMENTS

Figure 1 shows a diagram of a television system as an embodiment of a system for controlling electronics devices according to the invention. The television system comprises a remote control 101, a television receiver 102. The television system is capable of controlling a plurality of devices 112. The television receiver 102 comprises a device controller 103, which includes an infrared (IR) receiver 104, an IR transmitter 109, memory means 105, learning means 106, a central processing unit (CPU) 107, discrimination means 108, mapping means 110, and menu means 111.

The television receiver further comprises a tuner 113, a TV controller 114, and display means 115. The TV controller 114 is capable of controlling features of the television receiver 102, such as tuning to a TV channel, and controlling picture and sound parameters. The display means 115 comprises the video processing circuitry, and further comprises, or is connected to, a display screen for presenting video and graphical information to the user. Many details of the television receiver are left out for sake of clarity. Only the parts relevant for describing the present invention are shown.

IR commands from the remote control 101 are received by the IR receiver 104 and transmitted to the CPU 107. The discrimination means 108 determined whether the commands are meant for controlling the television receiver 102 or for controlling the plurality of devices 112. If the commands are meant for the television receiver 102, the commands are transmitted to the TV controller 114 to be executed to control the television receiver 102. If the commands are meant for controlling the plurality of devices 112, the they are converted by the mapping means 110 to device commands suitable for controlling the target device. The device commands are transmitted by means of the IR transmitter 109 to the target device.

Commands for controlling the plurality of devices 112 are stored in the memory means 105. New commands may be learned by means of the learning means 106, for example, by transmitting IR commands from a remote control of a new target device to the IR receiver 104. Such learning of new commands may proceed in a predetermined order, or under control of an interactive on-screen dialogue system, which indicates, inter alia, which command code is expected to be received, and whether a command code was successfully received. The dialogue may be further enhanced by, for example, displaying a graphical representation of the remote control of the target device, indicating to the user which key needs to be pressed. The TV has a built-in database where the top 5 or 10 brands of each device is captured. The user selects via a set up menu the device and the device controller prompts the user to select the brand. Due to a number of brands having a few code bases, the system will indicate the code base (e.g. IR Code 1, IR Code 2). The user needs only to select each of them individually. Once a selection is made, the TV will send an IR code corresponding to a common use function, e.g. standby. The user will now expect the highlighted function to operate. If that fails, the user is asked to either reset or to move on in selecting another IR Code.

Commands received from the remote control 101 may be directly converted to device commands by the mapping means 110. For example, a 'fast forward' command is sorted out by the discrimination means 108 and processed by the mapping means which retrieve a suitable VCR command from the memory means 105 and transmit the VCR command to the target videorecorder. Alternatively, device commands are generated by means of a the menu means 111. The user is enabled to pick a device specific function from on-screen menus, and the selected command is mapped on a suitable device command by the mapping means 110. Such menus may be stored in the television receiver 102 or received from the target device for display on the presentation means 115, e.g. via a wired connection.

Many alternative configurations are possible. In a preferred embodiment, the device controller is an integral part of the television receiver 102, sharing memory and processing circuitry. For example, the CPU 107 may be the central processing unit of the whole television receiver 102, including the TV controller 114. The memory means 105 may be part of a the main memory of the television receiver 102, used for storing, for example, channel presets, teletext or electronic program guide information, etc. Various components may be implemented as software components running on the central processing unit.

A mode change (or source change), for example between the television receiver 102 and any of the plurality of devices 112, or between two of said devices, may be explicitly requested

by the user, by means of dedicated buttons on the remote control 101 or menu items of the menu means 111. A mode change may also be caused by the discrimination means 108. If it is determined that a received command is meant for another device than that corresponding to the current mode, an automatic mode change may be effected.

- 5 Figure 2 shows a state diagram of various modes of the system according to the invention. The state diagram comprises a TV state 201, a source device state 202 and a sink device state 203. The TV state 201 corresponds to the normal TV mode, e.g. viewing TV channels or teletext pages. A source device is a device that can generate audio/video streams, e.g. a VCR, a DVD player or a set-top box. A sink device is a device that only receives an A/V stream, e.g. an audio amplifier. As discussed above, the system is capable of switching between the various states, either in response to an explicit user request, e.g. pressing a 'TV' button on a remote control, or in response to a command which can only be interpreted in another mode, e.g. a 'fast-forward' command causes the system to switch to a VCR state 202 automatically, and, for example, to display a VCR menu on the display screen of the television receiver.
- 10 Similarly, a audio command which is specific for an audio amplifier causes the system to switch to the state 203.

- Figure 3 shows a flow chart of the IR signal decoding and routing. In a state 301 the system is turned on and initialization actions are performed. After that a loop is entered in which the system is capable of receiving IR commands from a remote control. In a state 302 such an IR command is received. In a state 303 it is determined whether the command is meant for the television receiver itself or for any device which can be controlled through the television receiver. If the command is meant for the television receiver, the related function is performed in a state 304. Otherwise, the command is a device command for controlling any other device. In a state 305 it is determined whether the device command gives rise to a mode change to the TV mode. In that case the mode changes and the related command is performed in the state 304. Otherwise the command is mapped onto a suitable device command code in a step 306 and transmitted to the device in a step 307.
- 20
- 25

- In summary, using the TV's remote control, the user can send infrared commands to the TV that is meant for another home electronics device, e.g. a VCR, DVD, air conditioner or home lighting. The TV then translates these signals and generates new infrared signals that is compatible with the target devices.
- 30

The advantage of the invention, is as follows:

1. Only a simple set of IR codes used by the TV need to be maintained in the remote control. The devices IR codes are mapped to the TV's IR codes
 2. The TV acts as a smart interpreter of the codes and at times performs certain actions, like source switching without the user explicitly telling it to do so.
- 5 These advantages translate to:
1. Low cost remote control as compared to a universal remote control.
 2. Upgradeable module to incorporate new IR codes (at a low cost).
 3. User needs only to point to one place, i.e. the TV – ease of use.
 4. Remote control kept simple with the most commonly used commands. More complex
- 10 commands can be accessed on the TV menu – ease of use.
5. Less buttons to press as the TV will perform some of the functions automatically, e.g. mapping remote control keys to a device when source switched to that device.

- Although the invention has been described with reference to particular illustrative
- 15 embodiments, variants and modifications are possible within the scope of the inventive concept. Thus for example, instead of a TV a dedicated device comprising a display screen may be used. Instead of IR transmission, RF or any other technology may be used. Device-specific menus may be stored in the device controller or may be directly supplied by the controlled device.
- 20 The word 'comprising' does not exclude the presence of other elements or steps than those listed in a claim.

CLAIMS:

1. A system for controlling a plurality of home electronics devices, comprising a device controller and a remote control for remotely controlling said device controller, the device controller further comprising transmission means for transmitting command signals to the plurality of devices and mapping means for mapping the commands received from the remote control to device commands suitable for controlling any of the plurality of devices.
2. A system as defined in claim 1, the transmission means comprising an infrared transmitter for transmitting the device commands as infrared signals to the devices.
3. A system as defined in claim 1 or 2, the device controller being coupled to a display screen, and the mapping means comprising an on-screen menu system and being adapted to generate a command for controlling any of said devices in response to a user selecting an item from said menu system.
4. A system as defined in any one of claims 1 to 3, the device controller further comprising memory means for storing a command codes for a plurality of devices.
5. A system as defined in claim 4, the device controller further comprising learning means for learning new command codes and store them in the memory means.
6. A system as defined in any one of claims 1 to 5, the device controller being part of a television receiver.
7. A system as defined in claim 6, the device controller comprising discrimination means for discriminating commands for controlling the television receiver from commands for controlling any of the plurality of devices.
8. A device controller for use in the system as defined in any one of claims 1 to 7.

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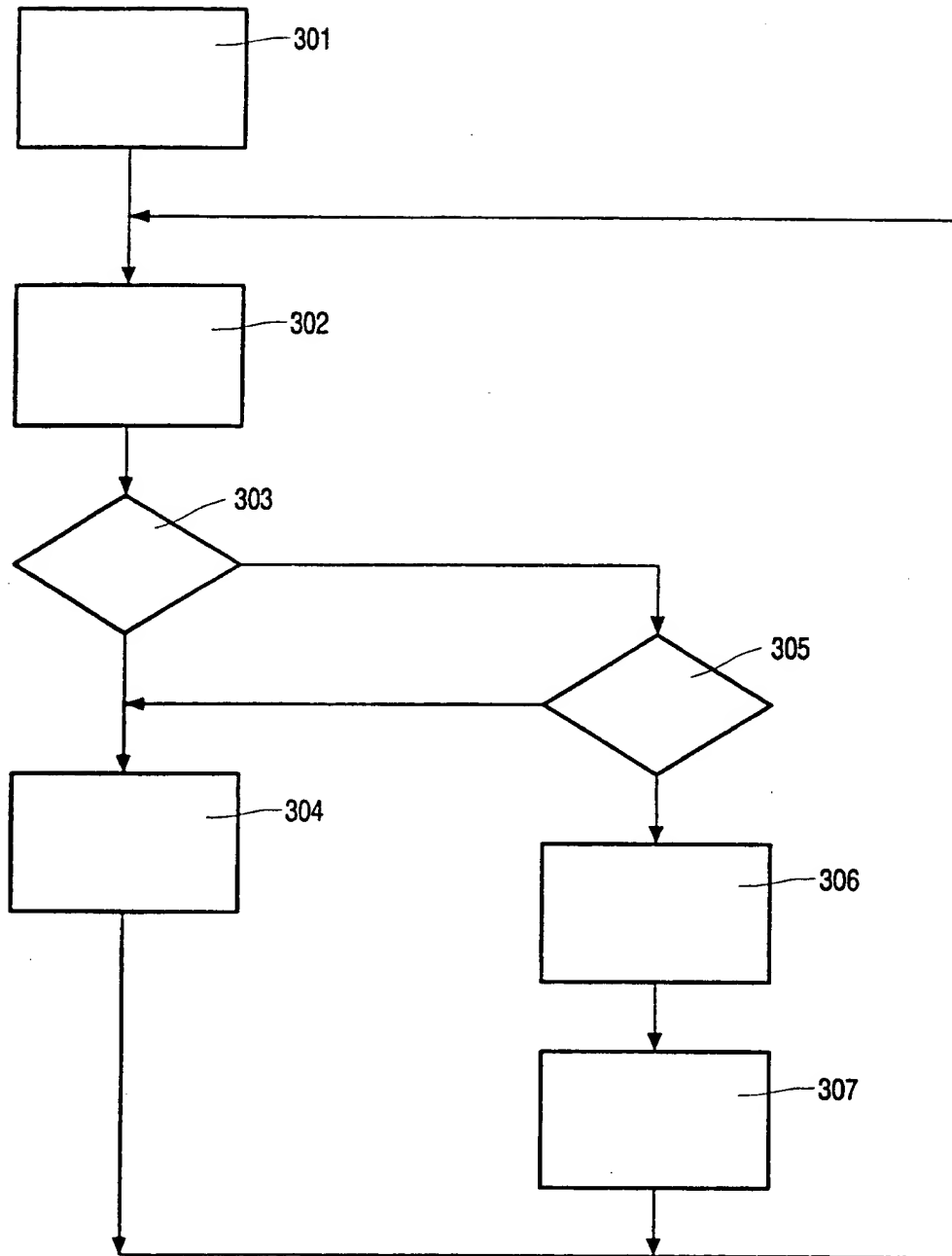


FIG. 3

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 G08C23/04

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 G08C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 081 534 A (GEIGER ERICH ET AL) 14 January 1992 (1992-01-14) column 3, line 39 -column 5, line 37	1,2,4-10
X	DE 195 34 883 A (METZ WERKE GMBH & CO KG) 11 April 1996 (1996-04-11) column 1, line 21 -column 2, line 53	1-4,6-10

☐ Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

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